

REMARKS

The Office Action mailed October 5, 2004 has been carefully reviewed and the foregoing amendment has been made in consequence thereof.

Claims 1, 3, 4, 7-10, 12, 13, 16, and 19 are now pending in this application. Claims 1-4, 7-13, and 16-19 stand rejected. Claims 2, 5, 6, 11, 14, 15, 17-18, and 20 have been canceled without prejudice, waiver, or disclaimer. Claims 1, 3, 4, 7-10, 12, 13, 16, and 19 have been amended. No new matter has been added.

The rejection of Claims 1-4, 7-13, and 16-19 under 35 U.S.C §112, second paragraph, is respectfully traversed. Applicants have amended Claims 1, 8, 9, 12, 13. Claims 3, 4, and 7 depend, directly or indirectly, from independent Claim 1, and Claim 16 depends from Claim 10. Applicants have canceled Claims 2, 11, 17, and 18.

Applicants respectfully traverse the suggestion on page 3 of the Office Action that Claim 8 is not further limiting. Rather, Applicants respectfully submit that Claim 8 further limits Claim 1. Specifically, Claim 8 includes, “at least one non-ultrasound shear strength test” and Claim 1 includes “at least one non-ultrasound test”.

Applicants also respectfully traverse the statement on page 3 of the Office Action that with respect to Claim 10, there is no connection between the least squares fit and the rest of the elements in the claim. Rather, Applicants respectfully submit that there is a connection between a recitation, “memory further contains a linear least squares fit between the amplitudes and the results from the at least one non-ultrasound test” of Claim 10 and remaining recitations of Claim 10. Specifically, the linear least squares fit in Claim 10 is between the amplitudes of received reflections of a plurality of second aircraft engine parts and the results obtained from the at least one non-ultrasound test. The amplitudes of received reflections of a plurality of second aircraft engine parts and the at least one non-ultrasound test are recited in the remaining recitations of Claim 10.

Applicants respectfully submit that Claims 1-4, 7-13, and 16-19, as amended, particularly point out and distinctly claim the subject matter which the Applicants regard as

their invention. Accordingly, Applicants respectfully request that the section 112 rejection to Claims 1-4, 7-13, and 16-19 be withdrawn.

The rejection of Claims 1-4, 7-13, and 16-19 under 35 U.S.C. § 103(a) as being unpatentable over D.T. Hayford, E.G. Henneke, II, and W.W. Stinchcomb, *The Correlation of Ultrasonic Attenuation and Shear Strength in Graphite-Polyimide Composites* (1977), referred to as Hayford et al., in view of Ansberg (SU 1322138 A) is respectfully traversed.

Hayford et al. describe a method for measuring attenuation in specimens (abstract). The method includes performing ultrasonic pulse-echo tests (page 439). Following the ultrasonic pulse-echo tests, short beam shear specimens are machined from a graphite polyimide strip and tested to failure (page 439). The method includes displaying a plot of ultrasonic attenuation versus a short beam shear failure load (page 439). Because a transducer overlapped two short beam specimens from each region, the same attenuation value is plotted for each of the failure loads measured for the specimens in that region (page 439). The method includes obtaining c-scans of two panels (75-30-B and 75-31-B) molded under the same time (1 hour) and temperature (600 °F) conditions (page 440). Failure loads for specimens cut from the poor quality 75-31-B panel shows much more scatter than data for the 75-30-B specimens (page 440). The method also includes tabulating c-scan and short beam shear test data (page 440). Correlation coefficient (R) between attenuation and failure load is higher for the 75-31-B specimens than for the 75-30-B specimens (pages 441, 442).

Ansberg describes a method including emitting ultrasonic impulses into a test rail. The method also includes detecting reflected vibrations from a bottom surface of the rail. Strength limit of the corroded test rail is calculated using an obtained coefficient of variation of an amplitude of the detected reflected vibrations and a correlation dependency.

Claim 1 recites a method of ultrasound inspection, the method comprising “providing a composite first aircraft engine part; introducing ultrasound to the first aircraft engine part; receiving a first set of at least one reflection of the ultrasound introduced to the first aircraft engine part; predicting a residual strength of the first aircraft engine part by using an amplitude of the received reflection with a plurality of results from a destructive and a non-destructive test performed on a plurality of second aircraft engine parts separate from the at

least one first aircraft engine part, wherein said predicting a residual strength is performed by correlating a plurality of amplitudes of a second set of received reflections of the second aircraft engine parts with at least one non-ultrasound test of each of the second aircraft engine parts, wherein said correlating the plurality of amplitudes comprises generating a linear least squares fit between the amplitudes and a plurality of results from the non-ultrasound tests.”

Neither Hayford et al. nor Ansberg, considered alone or in combination, describe or suggest the method recited in Claim 1. Specifically, no combination of Hayford et al. and Ansberg, describes or suggests predicting a residual strength of the first aircraft engine part by using an amplitude of the received reflection with a plurality of results from a destructive and a non-destructive test performed on a plurality of second aircraft engine parts separate from the at least one first aircraft engine part. Rather, Hayford et al. describe plotting ultrasonic attenuation versus a short beam shear failure load, plotting the same attenuation value for a failure load measured for specimens in a region, obtaining c-scans of two panels (75-30-B and 75-31-B) molded under the same time and temperature conditions, and tabulating c-scan and short beam shear test data. Hayford et al. also describe that correlation coefficient between attenuation and failure load is higher for the 75-31-B specimens than for the 75-30-B specimens. Ansberg describes measuring strength limit of a corroded test rail using an obtained coefficient of variation of an amplitude of the detected reflected vibrations and a correlation dependency. Accordingly, no combination of Hayford et al. and Ansberg describes or suggests predicting a residual strength of the first aircraft engine part as is recited in Claim 1. For the reasons set forth above, Claim 1 is submitted to be patentable over Hayford et al. in view of Ansberg.

Claim 2 is canceled. Claims 3, 4, and 7-9 depend, directly or indirectly, from independent Claim 1. When the recitations of Claims 3, 4, and 7-9 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claims 3, 4, and 7-9 likewise are patentable over Hayford et al. in view of Ansberg.

Claim 10 recites a ultrasound inspection system comprising “a pulse echo transducer; a processor operationally coupled to said transducer, said processor configured to predict a residual strength of a first aircraft engine part using an amplitude of a received ultrasound reflection; and a memory containing a correlation of a plurality of amplitudes of received

reflections of a plurality of second aircraft engine parts separate from the first aircraft engine part with a plurality of results from at least one non-ultrasound test of each of the second aircraft engine parts, said processor further configured to predict a residual strength of the first aircraft engine part by using an amplitude of a received ultrasound reflection and the correlation, said memory further contains a linear least squares fit between the amplitudes and the results from the at least one non-ultrasound test."

Neither Hayford et al. nor Ansberg, considered alone or in combination, describe or suggest a ultrasound inspection system recited in Claim 10. Specifically, no combination of Hayford et al. and Ansberg, describes or suggests a memory containing a correlation of a plurality of amplitudes of received reflections of a plurality of second aircraft engine parts separate from the first aircraft engine part with a plurality of results from at least one non-ultrasound test of each of the second aircraft engine parts, the processor further configured to predict a residual strength of the first aircraft engine part by using an amplitude of a received ultrasound reflection and the correlation. Rather, Hayford et al. describe plotting ultrasonic attenuation versus a short beam shear failure load, plotting the same attenuation value for a failure load measured for specimens in a region, obtaining c-scans of two panels (75-30-B and 75-31-B) molded under the same time and temperature conditions, and tabulating c-scan and short beam shear test data. Hayford et al. also describe that correlation coefficient between attenuation and failure load is higher for the 75-31-B specimens than for the 75-30-B specimens. Ansberg describes measuring strength limit of a corroded test rail using an obtained coefficient of variation of an amplitude of the detected reflected vibrations and a correlation dependency. Accordingly, no combination of Hayford et al. and Ansberg describes or suggests the processor further configured to predict a residual strength of the first aircraft engine part by using an amplitude of a received ultrasound reflection and the correlation, where the correlation is between a plurality of amplitudes of received reflections of a plurality of second aircraft engine parts separate from the first aircraft engine part and a plurality of results from at least one non-ultrasound test of each of the second aircraft engine parts. For the reasons set forth above, Claim 10 is submitted to be patentable over Hayford et al. in view of Ansberg.

Claims 11, 17 and 18 are canceled. Claims 12, 13, and 16 depend from independent Claim 10. When the recitations of Claims 12, 13, and 16 are considered in combination with the recitations of Claim 10, Applicants submit that dependent Claims 12, 13, and 16 likewise are patentable over Hayford et al. in view of Ansberg.

Claim 19 recites an ultrasound inspection device comprising “means for non-destructively testing a first aircraft engine part; and means for predicting a residual strength of the first aircraft engine part by using a result from a non-destructive test of the first aircraft engine part with a plurality of results from destructive and non-destructive tests performed on second aircraft engine parts substantially similar to and separate from the first part, wherein said means for predicting predicts the residual strength by correlating a plurality of amplitudes of received reflections from the second aircraft engine parts with at least one non-ultrasound test of each of the second aircraft engine parts, and said means for predicting correlates the amplitudes by generating a linear least squares fit between the amplitudes and a plurality of results from the non-ultrasound tests.”

Neither Hayford et al. nor Ansberg, considered alone or in combination, describe or suggest a ultrasound inspection device recited in Claim 19. Specifically, no combination of Hayford et al. and Ansberg, describes or suggests means for predicting a residual strength of the first aircraft engine part by using a result from a non-destructive test of the first aircraft engine part with a plurality of results from destructive and non-destructive tests performed on second aircraft engine parts substantially similar to and separate from the first part. Rather, Hayford et al. describe plotting ultrasonic attenuation versus a short beam shear failure load, plotting the same attenuation value for a failure load measured for specimens in a region, obtaining c-scans of two panels (75-30-B and 75-31-B) molded under the same time and temperature conditions, and tabulating c-scan and short beam shear test data. Hayford et al. also describe that correlation coefficient between attenuation and failure load is higher for the 75-31-B specimens than for the 75-30-B specimens. Ansberg describes measuring strength limit of a corroded test rail using an obtained coefficient of variation of an amplitude of the detected reflected vibrations and a correlation dependency. Accordingly, no combination of Hayford et al. and Ansberg describes or suggests means for predicting as recited in Claim 19.

For the reasons set forth above, Claim 19 is submitted to be patentable over Hayford et al. in view of Ansberg.

For at least the reasons set forth above, Applicant respectfully requests that the 35 U.S.C. § 103 rejection of Claims 1-4, 7-13, and 16-19 be withdrawn.

Moreover, Applicants respectfully submit that the Section 103 rejection of 1-4, 7-13, and 16-19 is not a proper rejection. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. Neither Hayford et al. nor Ansberg, considered alone or in combination, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicants respectfully submit that it would not be obvious to one skilled in the art to Hayford et al. with Ansberg because there is no motivation to combine the references suggested in the cited art itself.

As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levingood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicants' disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion or motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

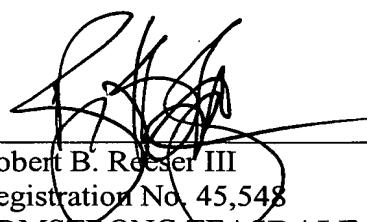
Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Specifically, Hayford et al. teach plotting ultrasonic attenuation

versus a short beam shear failure load, plotting the same attenuation value for a failure load measured for specimens in a region, obtaining c-scans of two panels (75-30-B and 75-31-B) molded under the same time and temperature conditions, and tabulating c-scan and short beam shear test data. Hayford et al. also teach that correlation coefficient between attenuation and failure load is higher for the 75-31-B specimens than for the 75-30-B specimens. Ansberg teaches measuring strength limit of a corroded test rail using an obtained coefficient of variation of an amplitude of the detected reflected vibrations and a correlation dependency. Since there is no teaching nor suggestion in the cited art for the combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicants request that the Section 103 rejections of Claims 6, 7, 9, 15-16, 19, and 21 be withdrawn.

For at least the reasons set forth above, Applicants respectfully request that the rejections of Claims 1-4, 7-13, and 16-19 under 35 U.S.C. 103(a) be withdrawn.

In view of the foregoing remarks, this application is believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted,



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